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Milking Procedures on U.S. Dairy Operations, 2007

In 2007, the U.S. Department of Agriculture's (USDA) National Animal Health Monitoring System (NAHMS) conducted the Dairy 2007 study. In all, 17 of the Nation's major dairy States* participated in the study. These States were divided into two regions and represented 79.5 percent of U.S. dairy operations and 82.5 percent of U.S. dairy cows. One objective of Dairy 2007 was to describe milking procedures and associated practices and to estimate the prevalence of contagious mastitis pathogens.

Contagious mastitis is caused by pathogens that typically spread from cow to cow during milking. Environmental mastitis is caused by teat-end exposure to an environmental pathogen.¹ Proper milking procedures can help control both contagious mastitis and environmental mastitis.²

Milker training

Although the owner/operator milked the majority of cows on most operations, the largest percentage of cows (68.2 percent) were on operations in which hired workers milked the majority of cows. Training milking personnel in the proper procedures used to milk cows and providing reasons for the procedures are usually ongoing processes.

The Dairy 2007 study reported that milker training increased as herd size increased, with 42.3 percent of small operations (fewer than 100 cows) training milking personnel compared with 75.3 percent of medium operations (100 to 499 cows), and 97.8 percent of large operations (500 or more cows).

A higher percentage of operations in the East region (48.9 percent) did not provide milker training compared with operations in the West region (15.6 percent). In the West region, hired workers milked the majority of cows on 82.7 percent of operations, while in the East region the owner/operator milked the majority of cows on 64.1 percent of operations. Almost all operations that trained milkers (97.1 percent) trained them on the job.

*States/Regions:

- **West:** California, Idaho, New Mexico, Texas, and Washington
- **East:** Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Vermont, Virginia, and Wisconsin

Milking frequency

Evidence suggests that increasing the times per day fresh cows (cows less than 30 days in milk) are milked increases milk production and that the increased production persists throughout lactation.^{3,4} More than 9 of 10 operations (91.8 percent) milked fresh cows twice daily compared with 7.6 percent that milked fresh cows 3 or more times daily. The percentage of operations that milked fresh cows three times per day or more increased as herd size increased.

The majority of operations milked cows other than fresh cows twice daily (92.5 percent). As was observed with fresh cows, the percentage of operations that milked cows three times per day increased as herd size increased.

Use of gloves

Mastitis pathogens can be spread from infected to uninfected cows during milking via the milkers' hands. Using latex or similar gloves can reduce the spread of mastitis, but gloves should be disinfected between cows.⁵

Approximately half the operations (55.2 percent) reported that milkers wore gloves to milk all cows. However, 76.8 percent of cows were on operations in which gloves were used, suggesting the practice is more common on large operations.

Clinical mastitis milking practices

Milking cows with clinical mastitis at the end of milking, with a separate milking unit, or in a separate string can reduce the exposure of noninfected cows to mastitis organisms.⁶ Approximately one of three operations (34.9 percent) used a separate milking unit to milk mastitic cows. A higher percentage of large operations (83.4 percent) milked mastitic cows in a separate string from healthy cows compared with small and medium operations (29.8 and 33.4 percent, respectively) [figure 1].

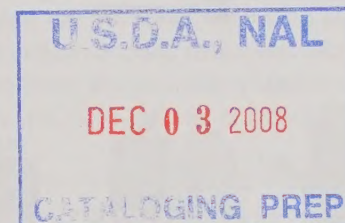
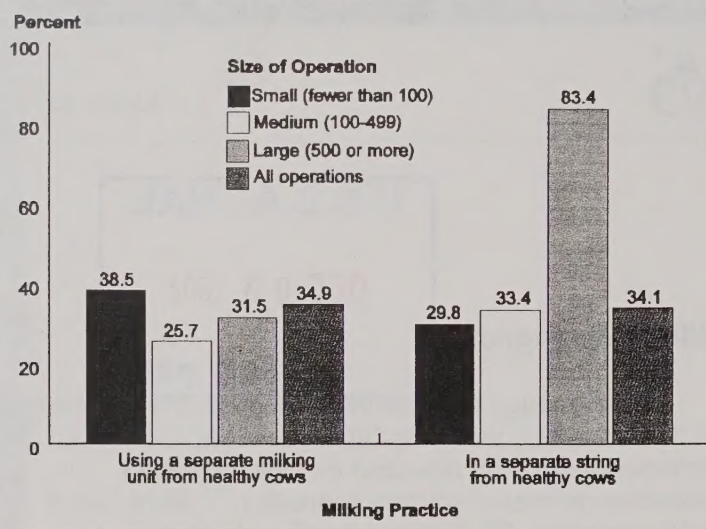


Figure 1. Percentage of Operations by Method Used for Milking Cows with Clinical Mastitis, and by Herd Size:



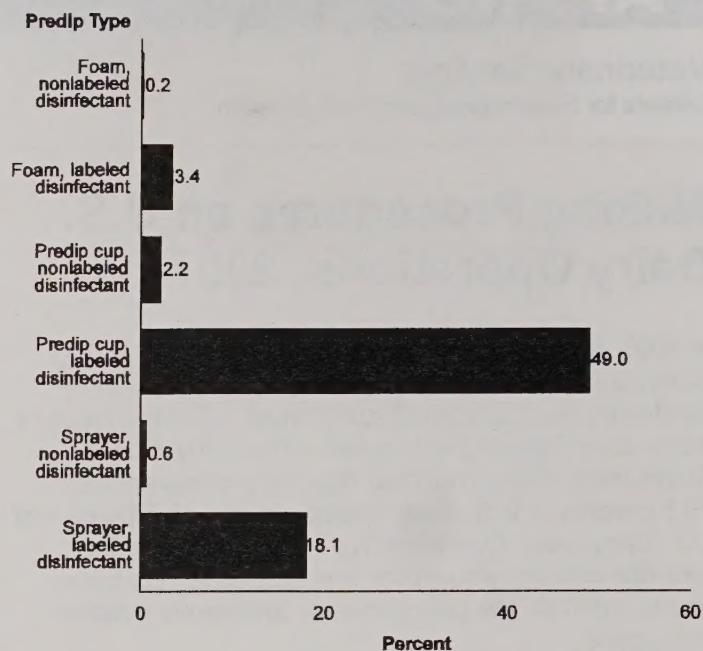
Teat preparation

Premilking teat disinfection has been shown to reduce environmental bacteria on the teat surface, reduce bacterial counts in milk, and may decrease the incidence of new infections.⁹ While there are many different methods to accomplish this, disinfectants should be tested for efficacy and labeled for teat disinfection.

Methods of washing teats include a water hose with disinfecting solution, a water hose without disinfecting solution, or disinfecting wipes. Using single-use towels helps prevent the spread of mastitis pathogens from infected cows to noninfected cows.⁷ More than 4 of 10 large operations (41.5 percent) used a wash pen prior to entering the parlor, compared with less than 3 percent of small or medium operations. There were no differences by herd size in the percentages of operations that used water hoses, with 2.8 percent of operations using water hoses with disinfectant and 4.2 percent using water hoses without disinfectant. A single-use towel using a labeled disinfectant was the predominant wet-wipe method used on 8.5 percent of operations.

Predip disinfectants can be applied via sprayer, cup, or foamer. Almost half of all operations (49.0 percent) applied a labeled disinfectant in a predip via a predip cup (figure 2), and no differences were observed across herd sizes. A higher percentage of operations in the East region used a predip cup to apply a labeled disinfectant to teats, compared with operations in the West region.

Figure 2. Percentage of Operations by Type of Predip Used



Forestripping

Forestripping cows stimulates milk secretion from mammary tissue, allows the milker to observe any abnormalities in the milk, and removes milk with a higher concentration of somatic cells, thereby improving milk quality.⁷ Overall, 92.6 percent of operations forestripped some or all cows.

If forestripping is performed before teat disinfection or while disinfectant is still on the teat, it may reduce the transfer of organisms from the milker to the teat. Teats may become recontaminated with bacteria if the forestripping is performed after drying.⁸ Over half the operations that forestripped any cows (56.7 percent) did so prior to teat disinfection or after teat disinfection but prior to drying, while 43.3 percent did so after disinfection and/or drying.

Drying

If teats are wet prior to milking, they should be dried with a single-use towel to decrease the risk of new infections. Liner slips—which occur more frequently when teats are wet—can cause rapid air movement inside the milking claws, resulting in injection of bacteria into the teat canal.⁷ In summer and winter, single-use paper and cloth towels were used to dry teats on approximately 55 and 21 percent of operations, respectively, while multiple-use paper and cloth towels were used on 0.6 percent and 7.1 percent of operations, respectively.

Automatic takeoffs

Incorrectly removing the milking unit can have a detrimental impact on udder health. Automatic takeoffs may improve teat-end condition by promptly removing the milking claws at a predetermined milk-flow rate.¹⁰ A higher percentage of medium and large operations (76.9 and 89.5 percent, respectively) used automatic takeoffs compared with 30.2 percent of small operations.

Postmilking teat dipping

Applying postmilking teat disinfectant kills mastitis pathogens before they can enter the teat canal and is the single most effective practice of reducing the incidence of contagious mastitis.² More than three of four operations dipped teats with a labeled postdip in summer and winter. Approximately 13 percent of operations sprayed teats with a commercial postdip in summer and winter. About 5 percent of operations performed no teat disinfection.

The majority of operations (about 70 percent) used iodophor compounds as predips and postdips in both summer and winter. Chlorhexidine was the next most common compound and was used by about 13 percent of operations.

Postmilking barrier teat dips provide additional protection against new coliform intramammary infections, although germicidal dips appear to provide better protection against environmental streptococci and contagious pathogens.² Approximately one of four operations used a barrier teat dip on all cows all the time (24.5 percent), and no differences were observed across herd sizes. About two-thirds of operations (66.7 percent) did not use a barrier teat dip. A higher percentage of operations in the East region (68.4 percent) did not use a barrier dip compared with operations in the West region (49.0 percent).

Backflush systems

A backflush system is used to wash the milking claw or cluster between cows, which reduces the spread of contagious mastitis pathogens.¹¹ A total of 6.8 percent of operations used a backflush system. Although no differences in the use of a backflush system were observed by herd size, there was a regional difference: 20.9 percent of operations in the West region used a backflush system compared to 5.4 percent in the East region.

Residue testing

Every tanker load of milk in the United States is tested at the milk plant for the presence of specific antibiotics prior to processing. Consequences of a positive test may include discarding the entire truckload of milk and suspension of the producer's permit to sell milk.

Milk from cows treated with antibiotics should be discarded for a specified withdrawal period, as directed by the drug manufacturer via the product label. Manufacturers are required to go through an exhaustive drug approval process that determines the withdrawal period. If approved drugs are used in the manner prescribed on the label, producers can use the withdrawal period stated on the label, knowing that the milk does not contain violative drug residues. However, producers may use on-farm drug-residue testing to be confident that the milk they are selling is free from violative drug residues.

One caveat of on-farm drug testing is that the residue testing kits are approved for bulk tank milk, not for individual cows. Using residue tests on individual cows may result in milk being discarded, even though it is below the violative level. Almost half the operations (49.8 percent) performed milk residue testing, with a higher percentage of medium operations (64.5 percent) testing compared with small operations (44.2 percent). While there are numerous residue screening tests available, the majority of operations that tested for residues (62.9 percent) used Delvotest[®]. Nine of 10 operations that screened for antibiotic residues (90.9 percent) tested individual cows that were recently treated for mastitis, and about 6 of 10 operations (57.8 percent) tested fresh cows.

Dry-cow therapy

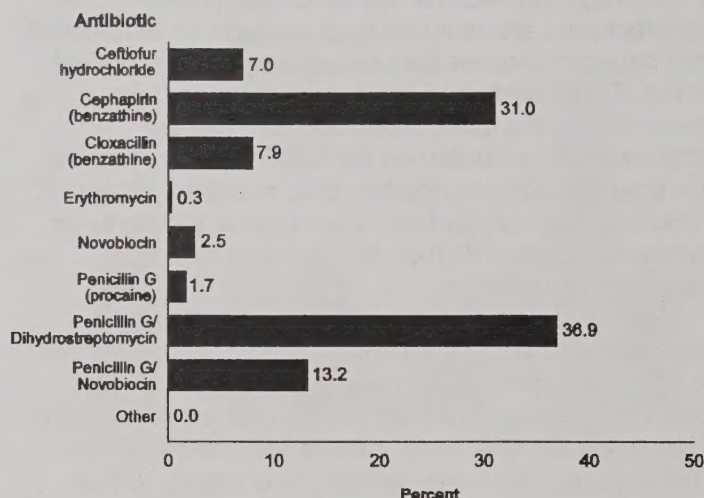
The purpose of dry cow therapy is to prevent new intramammary infections during the dry period and to treat subclinical udder infections.¹³ Dry-cow therapy includes the use of external sealants, internal sealant infusions, and antimicrobial infusions.

External teat sealants coat the exterior of the teat to prevent bacterial entrance into the gland. More than 8 of 10 operations (82.8 percent) did not use an external teat sealant at dryoff, while 14.0 percent of operations used a sealant on all cows at dryoff. There were no differences across herd sizes or by regions.

Internal teat sealants are another way to supplement the teat's defenses against bacterial infections. Proper hygienic insertion of the teat sealant is important to prevent contamination of the mammary gland.¹³ A higher percentage of medium and large operations used internal teat sealants on all cows at dryoff (45.7 and 49.0 percent, respectively) compared with 22.7 percent of small operations. Overall, 30.1 percent of operations used an internal teat sealant.

The use of intramammary antibiotics at the time of dryoff can cure many existing infections and reduce new infections. Almost 1 of 10 operations did not use any dry-cow treatment. Some of these operations were organic operations where the use of antibiotics is not allowed. For cows treated with dry-cow intramammary antibiotics, the most commonly used antibiotics were cephalixin and penicillin G/dihydrostreptomycin (31.0 and 36.9 percent of cows, respectively) [figure 3].

Figure 3. For Cows Treated with Dry-Cow Intramammary Antibiotics During the Previous 12 Months, Percentage of Cows Treated, by Type of Antibiotic



To review complete reports from the Dairy 2007 study, visit the NAHMS Web site at:
<http://nahms.aphis.usda.gov>

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For more information, contact:

USDA:APHIS:VS:CEAH
 NRRC Building B, M.S. 2E7
 2150 Centre Avenue
 Fort Collins, CO 80526-8117
 970.494.7000
 E-mail: NAHMS@aphis.usda.gov
<http://nahms.aphis.usda.gov>

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